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Digital Possessions After a Romantic Break Up

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Digital Possessions After a Romantic Break Up

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ABSTRACT

With technology becoming more pervasive in everyday life, it is common for individuals to use digital media to support the enactment and maintenance of romantic relationships. Partners in a relationship may create digital possessions frequently. However, after a relationship ends, individuals typically seek to disconnect from their ex-partner. This becomes difficult due to the partners' interwoven digital presence in the collection of digital possessions. In this paper, we report on a qualitative study exploring individuals' experiences of relationship break up in a digital context, and discuss their attitudes towards digital possessions from those relationships. Five main themes emerged from our results: digital possessions that sustain relationships, comparing before and after, tainted digital possessions, digital possessions and invasions of privacy, and involved and emotional reminiscing. Opportunities for design were identified in managing attitudes towards digital possessions, disconnecting and reconnecting, and encouraging awareness of digital possessions.

Author Keywords

Relationship break up; separation; divorce; HCI; life transitions; digital; memory; curation; media; identity.

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INTRODUCTION

Many people in the western world carry a smartphone, tablet or laptop as they go about their day-to-day life. This allows them to stay connected to friends, family, and the outside world. As these devices become more advanced, they provide individuals with even more opportunities to create and accumulate a large amount of digital material. With storage capacity increasing and price decreasing,

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individuals can easily amass comprehensive collections of digital items, the sheer volume of which can become overwhelming [13]. These comprise of images, videos, chat logs, emails, status updates, meta-data, login details, text messages, shared accounts and more [25,27].

In the context of this work, we use the term 'digital possessions' to collectively refer to these different types of digital materials. We do so because the possessions we discuss with our participants play a role in how they establish their identity and connect with others [24], similar to the role fulfilled by their physical counterparts. The traditional understanding of the word possession changes when placed in a digital context; the notion of ownership around digital possessions is more complicated than that of physical possessions. For example, knowing the location of a physical possession contributes to a feeling of ownership over that possession, however, digital possessions may have multiple locations and owners [18]. While the owner of a digital possession can give it to another individual and still retain a copy, giving a physical possession to another typically involves losing access to it. This lack of uniqueness surrounding digital possessions can change the meaning behind the act of sharing [11].

The collection of digital possessions amassed by an individual contribute to that individual's digital expression of self [16], with digital possessions that document an individual's experiences becoming the basis for their online identity. These collections are typically curated for public consumption online; an individual will select a subset of their digital possessions that they deem appropriate for sharing with their social circle via personal websites and Social Networking Sites (SNS) such as Facebook, Twitter, or Instagram. Yet self-representation is only one aspect of SNS; they primarily serve to connect people. For example, Facebook encourages its users to connect with current and new friends. This online connection between users is achieved through online communication, mediated partly through the sharing of digital possessions and their acknowledgement by network members (e.g. through 'Likes' and comments). As a result of SNS, the general public are creating and maintaining romantic relationships online as well as offline. In the context of this paper, 'relationships' refers to both formalised (marriages, civil partnerships) and non-formalised romantic relationships.

One in three Americans who married between 2005 and 2012 met their spouse online, and nearly half of these met

through online dating sites [5]. Digital technologies not only bring couples together, they also provide individuals with opportunities to *maintain* romantic relationships [6] or acknowledge relationship milestones, such as becoming a parent [30]. Just as individuals change and become part of a romantic unit once a connection is developed, their digital possessions reflect that change [29]; romantic partners generate digital possessions embedded with meaning, memories and a sense of joint identity. Although technology can support and encourage individuals to connect, it falls short when partners break up; to disconnect in a digital context is incredibly difficult [19].

In this paper, we report on qualitative research that examines romantic relationship break up in a digital context, with a specific focus on digital possessions relating to a romantic relationship that has ended. We explore the attitudes that individuals have towards their digital possessions, and how those attitudes change as a result of the break up. Additionally, we investigate whether or not a shift in attitude affects the ways in which individuals curate their digital possessions. We situate the research in the context of related work that examines the curation of digital possessions, disconnecting after a break up, and the role of technology in life transitions. We then describe the methodology and context of the research and the results, which are used as the basis for a discussion on opportunities for design for digital possessions and relationship break up.

RELATED WORK

There are a number of fields that consider research relevant to that of romantic relationship break up. In this section, we explore work from Human-Computer Interaction (HCI), cognitive psychology, and social psychology communities regarding digital possessions during and after a relationship break up, the effect break up has on identity, disconnecting after a break up, and technology in life transitions.

Digital Possessions

As individuals begin to spend more time interacting with digital media, digital possessions begin to play a role in everyday life similar to that of their physical counterparts [10]. While it is common to have shared physical possessions, especially within the context of a romantic relationship, research indicates that few partners have truly shared digital possessions [27], for example, a shared blog. However, romantic partners typically have, and contribute to, a collection of digital possessions that identifies them as part of a relationship and outwardly signifies their partnership. Partners can express their togetherness in a digital context by posting public displays of affection through status updates and wall posts on Facebook [3], selecting profile pictures depicting both partners [32], and adding each other's friends on SNS [32].

When a relationship comes to an end, these collections are typically managed through an act of symbolic detachment, where the ex-partners attempt to regain their individual sense of self by curating their digital possessions [27]. Sas

and Whittaker explored digital possessions in the wake of a romantic relationship break up from a material culture perspective, identifying three roles individuals can assume while curating their digital possessions following a break up [27]: *'Deleters'*, individuals that dispose of their digital possessions completely; *'Keepers'*, who retain all of their digital possessions; and *'Selective Disposers'*, who engage in a hybrid strategy of deleting and retaining possessions. The curation of digital possessions after a break up is important as it helps ex-partners to re-establish an identity as an individual rather than as part of a relationship [27].

Disconnecting After Break Up

When a romantic relationship ends, individuals can experience an unclear sense of self; their identity as a partner in a relationship is no longer accurate, and they need to construct a new identity as an individual [28]. It is not uncommon for those individuals to change their appearance, values, beliefs, or social groups in the process. This is often reflected in a digital context, where individuals curate their online presence to create a new, post-break up, representation of online self [19]. When a romantic relationship begins and/or is maintained in a digital setting, it is only natural that, upon breaking up, individuals may seek to disconnect from one another in this context.

However, with technology becoming more pervasive in everyday life, individuals' digital and physical lives have become increasingly intertwined. SNS are so focused on connecting users with one another that options around disconnecting are limited, beyond those offered by custom privacy settings or completely blocking particular individuals. The difficulty of disconnecting is illustrated vividly in domestic abuse cases, where digital communication technologies make it easier for abusers to stay connected to those who have left them [7].

An individual changing their relationship status on Facebook from *'In a relationship'* to *'Single'* or *'It's complicated'* is a common step among SNS users to make members of their social network aware of the change in their relationship status [19]. However, the persistence of digital possessions can cause issues with disconnecting after a break up; the digital possessions that once acted as a shared digital identity for the partners continue to exist even after the relationship comes to an end [19].

Each ex-partner may have some idea of which possessions they own, and can therefore curate or dispose of them as they please. These kinds of issues surrounding the ownership of digital possessions have been raised before [18,19,27]; the ease with which digital possessions can be copied, downloaded or shared makes ownership incredibly convoluted. However, the act of curating or disposing of these digital possessions, although potentially emotionally difficult [30], could be positive in the long-term. Increased positive mental health and subjective wellbeing can be generated by integrating memories from past relationships

into a revised identity as an individual, whether those memories are positive or negative [26].

Technology in Life Transitions

The break up of a romantic relationship is one of many life transitions being explored in an HCI context. This growing body of work attends to typical transitional events in the human lifespan, such as becoming an adult [22], having a child [30], retiring [8], and dying [17,20,31]. These life transitions encourage change in the way that individuals use digital technologies [2], mirroring the way technology actively changes the ways in which individuals experience these life transitions. For example, Walter et al. have highlighted the increasing role of technology during end of life, including how it affects dying, mourning, and what an individual leaves behind [31]. Parallels can be drawn between an individual experiencing the death of someone close to them and experiencing the end of a relationship, such as yearning for people, places, or things that the individual connects to the one they lost [23].

Research Gap

Previous research has looked into the roles people can assume when dealing with digital possessions generated from a previous relationship. The research reported in this paper builds on that work by Sas and Whittaker [27] by exploring an individual's *attitudes* towards these digital possessions, and how those attitudes affect curation, reminiscence, and identity. We explore the attitudes that individuals experiencing a break up have towards these possessions in order to aid in the development of future technology that supports individuals experiencing this type of life transition. We did this by carrying out a set of semi-structured interviews based around the 'story' of a break up, with a focus on digital possessions.

METHOD

The goal of this work was to explore participants' past relationships and their attitudes towards digital possessions from those relationships; how those attitudes did or did not change after the relationship came to an end. This was best captured qualitatively, through semi-structured interviews.

Participants

The research reported here was carried out in a number of cities in the UK. Participants were primarily recruited through links to the study website via SNS, as well as through snowball sampling in two cases. Participants ranged in age from 23 to 41, had been in a relationship between 6 months and 7 years, and had been separated from their ex-partners between 2.5 months and 14 years. Gender was mixed (3 male, 5 female). Participants were assigned pseudonyms. It should be noted that two pairs of participants were in committed relationships with one another at the time of the study. One partner recruited the other to take part (individually) in both cases; this provided an interesting opportunity to explore the experiences of long-term partners looking back at previous relationships, and to compare those with the experiences of the other

participants. All participants were educated to at least undergraduate degree level, and at the time of the study all participants were employed.

The participants' experiences and the nature and duration of their relationships were quite varied. No exclusion criteria were set with regards to the type of relationship that participants were a part of (e.g. marriage, civil partnership, informal partnership, or a heterosexual or homosexual relationship), and as a result interviews included participants from heterosexual, bisexual, dyadic and polyamorous relationships. One participant spoke about a relationship with a partner who had previously been divorced. None of the participants interviewed had been married *during* their past relationships, but two participants were married to one another at the time of writing. The small sample size reflects the difficulty with recruiting participants to take part in research that explores such a personal subject, but is similar to other qualitative research that explores sensitive contexts [7,12,21]. A small introduction for each participant has been included here:

Emma, 25, spoke of a heterosexual relationship that she had been involved in for four and a half years. She and her partner met at university and lived together for part of their relationship. Emma's break up from her partner was not amicable due to her infidelity, as well as issues related to her partner's alcoholism. Emma experienced harassment from her ex-partner despite her efforts to break the digital connection they shared. The relationship came to an end one year and nine months ago, and Emma is currently in a relationship with a new partner.

Christopher, 28, discussed a relationship that was carried out entirely online with a female partner who lived overseas. The relationship lasted for 9 months, and came to an end 14 years ago (the longest time since separation of any participant) due to 'the unsustainability of [this type of] relationship'. Christopher considered it to be his first real relationship. He is currently married to another participant in the study, *Laura*.

Laura, 28, talked about her time in a heterosexual relationship during her final year in high school. Although she thinks of the time she spent with her ex-partner as her first real relationship, looking back she described it as simply young love. The relationship lasted for 6 months, and came to an end 11 years ago when her partner broke up with her. *Laura* is currently married to another participant in the study, *Christopher*.

Nicola, 28, discussed a heterosexual relationship that lasted three years after she met her partner on Match.com. The majority of the relationship was long-distance. The couple eventually cohabited but broke up soon after as a result of 'different expectations' concerning living together. *Nicola*'s relationship came to an end five months ago, and she is currently single.

Andrew, 41, spoke of his time in a three-year heterosexual relationship with his partner. Andrew was in a relationship with a woman who had two children from a previous relationship. The pair mutually ended their relationship four years ago, as they were both worried about the effect their relationship was having on one of those children. Andrew is currently in a relationship.

Claire, 23, discussed a polyamorous relationship she had been involved in. Claire had been in a relationship with a male partner for almost four years before they both entered into a polyamorous relationship with another couple. The male partner from the second relationship left soon after it began, but the female partner stayed, resulting in a triadic polyamorous relationship between Claire, her male partner, and their female partner. This female partner decided to break the relationship off and leave the triad after nine months, with the three trying to maintain a platonic friendship. Claire and her male partner remained together and are currently in an open relationship. This break up took place two and a half months ago, and is the shortest time since separation for any of the participants.

Michelle, 28, talked about her time in a heterosexual relationship that began towards the end of high school¹ and continued on into her adult life, spanning seven years in total. Michelle described the relationship as immature, stating that it never developed past being a teenage relationship. Three years ago the relationship came to an end as a result of her partner's hidden gambling addiction becoming a serious issue for the pair, with Michelle instigating the break up. Michelle is currently engaged to another participant in the study; John.

John, 33, spoke of his experiences concerning a relationship that lasted over four years. He and his partner lived together for three years, but broke up as a result of her infidelity. John described the break up as being laborious and messy, and he was the subject of some harassment from his ex-partner after the split. The relationship came to an end three and a half years ago. John is currently engaged to another participant in the study; Michelle.

Approach

Semi-structured interviews were carried out on a one-to-one basis to explore participants' attitudes towards digital possessions relating to a past relationship. The interviews took place in the homes of the participants when possible, where participants were surrounded by their belongings and had access to their digital possessions. We discussed digital possessions that participants considered to be positive, as well as those that participants considered to be negative in order to garner a full understanding of how an individual's perspective could change with regards to their digital possessions. Discussing digital possessions often resulted in participants reminiscing about related experiences, allowing

the researchers to gather additional data addressing the nature of these relationships and the kinds of memories the digital possessions cued. Three interviews (Andrew, Michelle and John) could not take place at the participants' homes; however, those participants brought devices with them that allowed them to access their digital possessions during the interview.

Mean interview time was 1 hour 3 minutes (longest was 1 hour 34 minutes, shortest was 41 minutes); some interviews took longer due to a large number of digital possessions that the participant wanted to discuss, some shorter due to a smaller number of digital possessions to explore. The participants were entered into a raffle for an Amazon gift voucher to be handed out after the interviews ended. The interviews consisted of questions that explored the participants' relationship with keepsakes, the background of their chosen relationship, and the circumstances surrounding the break up, as well as positively and negatively associated digital possessions pertaining to the relationship, and the story behind them.

The interview questions were open-ended (for example, *What was the relationship like?*) and the researcher let the participant lead whenever possible [15], encouraging elaboration by asking probing follow-up questions when necessary [15] (for example, *How did you meet? Why did you consider it to be a serious relationship?*).

The Universities involved granted ethical approval for the study. Due to the personal nature of the interviews, the researcher had procedures in place to minimise risk to participants. Participants were watched for signs of distress, and were offered opportunities for breaks whenever necessary. The researcher brought contact details for counselling services to each interview, in the event that participants became distressed or wanted to talk to a professional about their experiences.

Voice recordings and observational notes were gathered during the interviews. Transcripts were coded and analysed through thematic analysis [4], grouping similar experiences together in order to identify themes across all participant interviews. The themes were refined through the iterative thematic analysis process in order to generate a final, distinct set of themes.

RESULTS

Five overarching themes were identified in the data relating to the attitudes the participants had towards their digital possessions: digital possessions that sustain relationships, comparing before and after, tainted digital possessions, digital possessions and invasions of privacy, and involved and emotional reminiscing.

Digital Possessions that Sustain Relationships

Digital technologies not only provide individuals with the opportunity to connect with one another. They also encourage individuals to sustain that connection, or in the case of a romantic relationship, maintain that relationship.

¹ Between the ages of 17 to 18 years old.

Nicola reported that for the long-distance duration of their relationship, mobile phone calls and sometimes texts were the main methods of communication between her and her partner. It was only upon reviewing her digital possessions during the course of the interview that Nicola realised just how frequent her use of SNS was to communicate with her then partner: *"'Older messages, 25,514!' Okay, so, a lot of it (communication) was obviously over Facebook!"*

It is worth noting that Nicola remembered the phone calls she had with her ex-partner, but not the 25,000+ Facebook messages they had exchanged. During the course of the interview, Nicola realised just how many of her digital possessions still existed despite the fact that the relationship she had been discussing had come to an end. Had these conversations taken place in a physical context, they would be considered ephemeral and have passed by unrecorded, however, they persist in the digital world, and maintain a link between the ex-partners; just because the relationship had ended, that did not mean that the digital possessions disappeared along with it: *"I think I've been like, 'Okay, it's finished, just, forward.' But obviously that stuff is all still there, and it's ...lurking there... if I wanted to I could go back through the whole thing. All 25,514 Facebook messages, you know?"*

She continued by explaining: *"It's not that I'd prefer to keep them... I feel like deleting things is a very active, kind of, negative thing. It happened, and sure it wasn't great all the time, it wasn't bad all the time, but it happened, and it is part of my history, so part of me feels like ...while I might not look back at it, it still exists."*

The digital possessions that Nicola is discussing are a link to her identity at the time of the relationship, and she views them as a part of her history. Deleting any of those possessions would result in a change to the online record of her relationship, rewriting the joint identity those possessions represent. Nicola also raised concern that by, for example, removing any images from her Facebook profile that contained her ex-partner, she would be misleading future friends or partners: *"... I don't want somebody to look at my Facebook photos and go 'Oh, you went to [place name], that was great, you drove around and all this kinda stuff,' and then me go 'Yeah, it was great, it was with my ex-boyfriend,' and they're like 'Oh...'"*

Andrew spoke about a set of files from a music album as a key digital possession from his past relationship. Andrew co-wrote and co-performed a number of the songs that were recorded by his ex-partner on an album, which Andrew also produced. He still uses songs from the album to keep calm and to take his mind off unpleasant experiences, such as travelling by plane: *"You know, I'm not keen on flying, I go to [public events], I kind of like that it makes me feel quite relaxed, listening to that."*

By keeping the album available to him on his phone, Andrew maintains a connection to this past relationship. He

actively seeks out and interacts with this digital possession that links him to his ex-partner in a very meaningful way.

Comparing Before and After

Whether or not attitudes towards digital possessions changed after break up varied depending on the participant and the possession. For some participants, the end of the relationship only reinforced the original attitudes they maintained towards their digital possessions: *"... I think the fact I'm not with her now, listening to the music she writes, kind of makes me think it's even more valued in a way."* - Andrew

In contrast to this, other participants looked back at their digital possessions with a sense of regret. Digital possessions that originally had positive associations act, in hindsight, as evidence of events that contributed to the end of the relationship: *"... it's sort of tinged with the memory of, in the picture I don't know if you can tell, but he's quite drunk... that was just the start of him going into drinking, a lot. But obviously at the time I didn't notice..."* – Emma

Although there was no change in the majority of attitudes towards digital possessions discussed, some possessions that had positive associations during the relationship were assigned negative connotations after the relationship had ended. However, the reverse was not true; none of the negatively associated digital possessions acquired positive associations after a relationship break up occurred.

Neither Christopher nor Laura had a large number of digital possessions to discuss; both of their relationships took place before social media was widely used or available, and technology was not quite so ubiquitous that they were creating digital possessions frequently. Christopher in particular highlighted the difficulty he experienced in simply creating digital possessions: *"...there were no smart phones and things, so even the process of digitising an image was quite complex, you had to get a scanner, put it in..."* – Christopher

The types of digital possessions Christopher discussed included emoticon packs for instant messenger software and the websites he and his partner made and maintained. Although these possessions held some meaning for Christopher at the time of the relationship, his attitude towards them now is that of ambivalence; he was neither strongly positive or negative about most of the possessions he discussed, potentially because the relationship and subsequent break up took place over a decade ago.

Only three participants reported deleting digital possessions due to negative connotations; Michelle described a simple outlook for the disposal of digital possessions that she applied not only to those pertaining to her past relationship: *"I would never have a photograph that would remind me of a negative thing. I just wouldn't do that... I would never keep a photograph that I thought made me look fat, or ugly, because I don't want to look at that. Why would I want to?"*

This attitude was echoed by Emma. Google continually drew her attention to digital possessions from her past relationship by listing them in results from her searches. Rather than having to face (often quite negative) reminders of her past relationship, she resolved the problem by simply disposing of the possessions: *"I ended up deleting a lot, just 'cause on Google stuff, you'd search and it would pop up in the chat history, just because you mentioned something, and I was like, 'I don't wanna be seeing that!'"*

Tainted Digital Possessions

Some of the digital possessions not disposed of after a break up were considered 'tainted' due to the links they maintained between ex-partners. These possessions were distinct to those that cued negative associations. They still had the capability to cue positive reminiscences, but could not be shared with their owner's current or future partner due to the role of the ex-partner in those memories. This was seen in a collection of photographs documenting a holiday John had taken with his ex-partner. John expressed frustration at the fact that his ex-partner featured in photographs he would otherwise have been happy to share: *"... my experiences travelling, I've always wanted to ... share with Michelle but because I went with [ex-partner]... It's like I've never dared go through the album with her... to share all these amazing things that I saw, because it's interspersed with pictures of [ex-partner]... the history is manifest in the fact that she's present in the pictures... that whole section of my life and formative experiences and stuff is something I have not shared for that reason."*

John rejected the idea of selectively disposing of the photographs that depicted his ex-partner and retaining the images that did not: *"I haven't gone through that process of [deleting], and it feels a bit silly to do that in a way, to go through and delete the ones of her. So I've just not gone back to it at all."*

Digital Possessions and Invasion of Privacy

A number of participants (n=4) experienced some form of invasion of privacy after they broke up from their partner, and were reminded of that breach of privacy through the digital possessions discussed during the interviews.

Emma explained that while she was in a relationship with her ex-partner, they had used Google Location to keep one another informed of their whereabouts: rather than texting, each partner could simply check the other's location. However, after the relationship ended, Emma forgot to remove access to her location from her ex-partner, and was surprised by his knowledge of her movements: *"I couldn't figure out how he knew when I was at a friend's house."*

After driving a male friend home from a night out, Emma received a large number of threatening messages from her ex-partner via Facebook Messenger: *"I got, like, hundreds of messages that night. About 'You'd better find somewhere else to park your car,' ... 'I hate you, if I ever see you again I'll put your head through a wall.'"*

Even after blocking her ex-partner on every SNS, Emma was still unable to break the connection. She began to receive spam emails from temporary email accounts and discovered keylogging software on her personal computer. Emma felt that her only option was to simply outlast the torrent of messages and emails that were being sent to her, and formatted her PC to dispose of the keylogger and limit future harassment. It was almost a year and a half after the break up before she stopped receiving them.

Claire found herself in a contrasting situation to that of Emma, where she was the one creating a privacy breach. During the relationship, sexual photographs of Claire's ex-girlfriend were taken and shared between the three partners. After the break up, Claire found it difficult to determine what responsibility she had towards the photographs: *"I kind of feel awkward, because there isn't going to be a sexual element to the relationship anymore, and it kind of feels like I'm maintaining some part of the sexual relationship, but it's finished."*

Although these digital possessions were in Claire's possession during the relationship, she felt that, by keeping them, she was keeping the sexual element of this now platonic relationship alive, without the knowledge or consent of her ex-partner. The problematic question of ownership of digital possessions comes to the fore here [18]; as the photographer, does Claire own the photographs, or as the subject of those photographs, does ownership fall to her ex-partner? Regardless of ownership, what kind of relationship should Claire have with these digital possessions now that the context of her relationship with her ex-partner has changed?

Michelle and John also experienced invasions of privacy upon breaking up from their partners. Both participants were harassed by their respective ex-partner via text messages, and had to block the phone numbers of their ex-partners in order to break the connections. John said: *"...the reason I deleted and blocked her is 'cause she was kind of harassing me afterwards. So it's not just that I was desperate to wash my hands clean of her. It was the practical design to just... [make life a little bit easier]."*

Involved and Emotional Reminiscing

Digital possessions have the power to cue memories for individuals [14]. In the context of romantic relationships, significant possessions can cue strongly emotional memories for individuals. The participants who were currently in relationships with other participants (Christopher/Laura, and Michelle/John) had strong reminiscences about their current partners, but seemed to only connect weakly with the digital possessions linking them to their ex-partners. Conversely, Nicola, who was still single, and had one of the shortest times since separation from her ex-partner, had the strongest emotional reminiscence of any participant.

The types of digital possession that cued reminiscence varied from participant to participant, but included video, audio, image, and text in the form of chat histories. Nicola had created a video for her second anniversary with her then-partner. The video was a slide show of photographs that she felt summed up important or particularly enjoyable moments in their relationship, and was set to a romantic song (*How Long Will I Love You* by Ellie Goulding). Nicola provided an explanation to the researcher alongside each photograph, giving background and establishing context, but as the video went on she became less talkative and more withdrawn. After the video drew to its conclusion, Nicola became upset as she reflected on the experience of watching the video for the first time since her relationship came to an end, beginning to cry as she explained: *"Gosh, that's quite hard to watch now... At the time I thought... we're going to be together forever. So that's positive, 'cause it goes through all of the really nice things that we did together, and y'know, I obviously felt close to him at the point that I made it, so... [begins to cry] I think it's 'cause it's something I made for him, and, like, knowing that we've now split up, it's just, like, hard to watch."*

Viewing this video file produced the strongest emotional reminiscence of any participant; Nicola was visibly affected by the experience, more so than any other participant or by any other type of digital possession. This is potentially due to the content of the video; curated materials brought together for the purpose of highlighting togetherness between the then-partners. A combination of remembering the experiences depicted in the video, remembering the act of creating the video, and remembering the experience of sharing the video with the ex-partner may also have some impact on the strength of reminiscence experienced. Alternatively, or perhaps additionally, this strong emotional reaction may have been a result of clashing identities; lack of clarity around identity after a relationship comes to an end has previously been seen to contribute to the emotional distress individuals feel upon breaking up [28]. In this instance, Nicola, having established an identity as an individual since her break up, was confronted with evidence of her identity as a partner in a relationship – an identity that was no longer current.

Summary of Results

The introduction of technology into a romantic relationship makes disconnecting completely from ex-partners incredibly difficult. The various ways in which technology supports connection between individuals can be subverted and used to force connections that may not be wanted. Arguably these unwanted connections are easier to create than actually disconnecting from existing ones. Once an ex-partner has an individual's personal information (such as access to their Facebook profile, their phone number, or email address), they then have multiple avenues by which they can attempt to reconnect after a break up.

By engaging in or maintaining a romantic relationship in a digital context, individuals are constantly generating digital possessions, sometimes without realising they are doing so. These digital possessions are often used during the relationship to sustain the connection between partners, for example, through instant messaging. After the relationship comes to an end, digital possessions can be used to maintain a link with the now-defunct relationship for sentimental reasons.

The digital possessions were seen to cue reminiscence in participants, to varying degrees. A number of participants merely reported experiences surrounding a digital possession or the memory it cued them to recall, while others experienced stronger, emotional reminiscence of events relating to their past relationships, exhibiting distressful behaviours such as crying, talking less, and using more strongly affected language.

Participants ascribed positive or negative qualities to their digital possessions. This was specific to each possession, the relationship those possessions were connected to, and to the circumstances of how that relationship ended. Some participants experienced a change in attitude towards digital possessions after a break up, and when this was the case, those attitudes consistently shifted from being positive to negative. Some digital possessions from past relationships were seen as 'tainted' due to the influence of an ex-partner. Although these possessions held enough meaning to ensure they weren't disposed of, they could not be shared with current or future partners in a denial of an individual's past, for the sake of the current partner's sensibilities.

DISCUSSION

In the research reported above we investigated digital possessions with regards to relationship break up, and how an individual's attitude towards those possessions changed over time. We invite designers of digital content management systems and online services to provide richer functionality to enable individuals to disconnect and to deal with the digital possessions that remain after a relationship has ended. In this section we discuss opportunities for design that have emerged from the study: managing attitudes towards digital possessions, disconnecting and reconnecting, and encouraging awareness of digital possessions.

Managing Attitudes Towards Digital Possessions

Personal identities, preferences, and choice of tools may persist beyond the end of a relationship. Thus, there should not be an expectation that an individual would need to separate completely from these practices and preferences that were a part of their previous relationship; individuals do not simply stop using all tools, services, and media after a break up. There may be scope for designing a means of carrying forward positively associated digital possessions into a new, revised identity, after a break up.

An example of this was clearly demonstrated in Andrew's continued positive relationship with the music he and his ex-partner created while they were together. It is possible that Andrew's own personal connection with the music, as a musician and a producer, let him 'unlink' the media from his ex-partner and their relationship, and 'link' it to something else, for example, his individual identity as a musician. Conversely, John has a passion for photography, but he was unable to disconnect photographs of his travels from his ex-partner. However, the fact that he continues to document his current relationship in a similar manner demonstrates that the experience has not discouraged his practice. This may mean that although he considers the photographs as tainted, the act of photography is not.

The negative attitudes described by participants towards digital possessions are not necessarily bad things. Although individuals may not enjoy interacting with certain digital possessions due to negative connotations, those possessions may still serve a purpose. In the context of a relationship break up, they act as links to the history of that relationship, and have emotion and meaning embedded within them. However, some digital possessions that have negative connotations could be considered 'tainted' due to the influence of an ex-partner on the possession, if for example, the partner is depicted in the possession, or is overtly linked to it somehow. As a result of this, individuals may feel restricted from sharing the possessions with their current or future partners, yet be reluctant to dispose of them. Again, there may be an opportunity here to design for the reframing of digital possessions; changing the context in which they are viewed or stored in order to change an individual's attitude towards them.

By designing for reflection in a post-break up context, we could provide ex-partners with opportunities to come to terms with their relationship ending. Curating or disposing of digital possessions in this context is emotionally taxing, and as a result, is often left incomplete [27]. Rather than automate the process to resolve this, however, it could be more beneficial to create a streamlined method of curation and disposal. By manually curating and disposing of these digital possessions, ex-partners have the opportunity to integrate memories of their past relationship into a revised identity as an individual; although difficult, doing so can lead to an increase in positive mental health and subjective wellbeing [26]. A system that presents digital possessions for curation or disposal in a way that is not distressing to individuals, but provides opportunities for reflection, would be beneficial, and is the next step in this research.

Disconnecting and Reconnecting

Disconnecting from an ex-partner in a digital context is incredibly difficult because of interwoven digital presences and digital possessions forging a connection. Information such as current location data or login credentials, which were useful to share between partners during a relationship, suddenly become invasions of privacy after that

relationship has come to an end. Individuals do not typically keep a record of what accounts or information they have given access to their partner.

Individuals could be empowered to remove access rights upon a relationship break up by simply automating the process of tracking access. A simple solution may be to track the devices that access an individual's personal accounts and sensitive information (similar to a Google account's list of recently used devices) and link that tracking system to an individual's relationship status. Upon ending the relationship and changing their status, the individual could receive an automated message requesting approval for devices on the list. Any devices not granted approval could be blocked from accessing accounts, even if they have the correct login credentials.

Not all relationships will necessarily come to an unpleasant end, and it is important to consider how perspectives towards past relationships can change over time. Laura was initially very distraught when her partner ended their relationship, but as time passed and she moved on, she saw benefits to having her ex-partner as a friend on Facebook: *"Yeah, probably Facebook's been quite good... I think he has a girlfriend now, so it's quite nice to see that he's moved on and is quite happy and stuff, so."*

This presents an opportunity for various degrees of disconnection to be made available to individuals on SNS; in some cases individuals may not want an active connection with an ex-partner, where in others they may only want to see important status updates (such as Facebook's Life Events). The level of contact an individual wants to maintain with an ex-partner may change over time, and the capability to change and fine-tune that connection could be useful as perspectives change.

Prior work has concluded that an individual changing their relationship status on Facebook is a common step among SNS users in publicising the end of a relationship [19]; it can be seen as a very visible attempt to disconnect from an ex-partner. In the break up of the polyamorous relationship explored in this study, the participant touched upon the lack of support for her non-traditional relationship type on SNS, specifically citing Facebook's restrictive relationship status feature. Unable to have more than one partner listed on her status at one time while in the triadic relationship, Claire was then unable to change her status to reflect her transition to a dyadic relationship; as far as Facebook was concerned, Claire and her ex-partner were continuing the same relationship they had previously shared. Facebook had previously expanded the gender categories it provided from 3 options (male, female or private) to 58 [9], but now allows individuals to define their own gender identity [33]. A natural progression may be for Facebook to include a similar, expanded list of relationship status options, or to let users define their own relationship type, to allow all individuals the opportunity to disconnect from an ex-partner through accurate relationship status updates.

Encouraging Awareness of Digital Possessions

When partners enact some of their relationship in a digital context, they generate digital possessions with great frequency. During the interview process, participants frequently rediscovered digital possessions from their past relationship that they did not realise they had. One participant, Nicola, severely underestimated the extent to which she and her then-partner had engaged in conversation via Facebook chat. This suggests that although messaging was the most frequent method of communication between the couple, it was considered to be more of a background activity than a prime method of communication, mirroring mundane conversation that regularly takes place offline in daily life [1]. It may have been used regularly to sustain the relationship, while phone calls, initially cited as the most used form of communication, were less frequent and, therefore, potentially more memorable. The rediscovery of these digital possessions, for Nicola in particular, became overwhelming.

Increasing awareness of possessions from during and after a relationship may empower individuals such as Nicola to manually curate their digital possessions. For example, an abstracted representation of the frequency of interactions between an individual and their ex-partner may help each party identify what materials exist, and therefore what materials to keep or delete, framed against the lifespan of the relationship. By taking an overview of the content they have, individuals may be able to make higher level choices concerning curation without having to reread each 'billet doux' and love letter.

Applications such as *Time Hop* or Facebook's *On This Day* attempt to prompt an awareness of some possessions by presenting users with photographs or status updates from the current date, but some years ago. Individuals are then given the option of posting a 'memory' to their timeline. Unfortunately, this does not encourage individuals to explore their digital possessions, instead limiting them to content posted on specific dates. An extension of these applications that assists individuals in rediscovering their digital possessions (through some other constraint than date or time) may be helpful here. Increased familiarity with digital possessions could lead to easier curation or disposal after a break up, as well as (optimistically) encouraging proactive curation as a regular task.

However, rediscovery of digital possessions is not always welcome. In Emma's case, Google search results returned her old chat histories with her ex-partner to her in its search results. Emma responded to this unwelcome rediscovery by deleting these digital possessions, to prevent further contact with them. There is an opportunity here for designers to explore how to limit search results in a more nuanced manner than is currently available; for example, through a metalevel search 'exclusion' that persists through multiple searches, until the user chooses to remove or refine it.

CONCLUSIONS

This study focused on the experiences of eight adults between the ages of 23 and 41. We uncovered opportunities for design around managing attitudes towards digital possessions, disconnecting and reconnecting, and encouraging awareness of digital possessions. The sample size reflects the difficulty with which participants were recruited for research exploring such a private and sensitive subject, but the backgrounds and experiences of the participants were diverse. Each relationship and break up discussed in this research was unique, and no attempts have been made to generalise the findings.

Digital possessions are easy to create considering the pervasiveness of technology in everyday life. With romantic relationships enacted and maintained more and more in a digital context, the generation of digital possessions in and around a relationship can be frequent and almost effortless. While this is beneficial to partners during a relationship, it can be difficult to deal with this collection of digital possessions if that relationship ends. Difficulties include individuals retaining access to their ex-partner's login credentials and misusing that information. A number of opportunities for design have been identified that could prevent these difficulties from manifesting, or at least limit the impact they can have on individuals experiencing a relationship break up.

This research has contributed to a growing body of work around life transitions in HCI. It has explored individuals' experiences with relationship break ups, and their attitudes towards digital possessions emanating from those relationships. Our findings identified opportunities for design in this context, with the aim of supporting people to disconnect in an environment that continually promotes connections with other individuals.

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